

Work Order ID 124833

124833

Page 1

Wednesday, September 24, 2014 9:24:13 AM

Item ID: D412-664-203TRN

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Turning Detail

Stop ***NS2***

Start Date: 9/24/2014 Start Qty: 1.00

1

Cust Item ID:

Required Date: 9/24/2014 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MLS Date: 1409-24 Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
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D412-664-243	F
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100

0.00

100

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

0.00

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA166

2-Turn first side as per Folio FA166

3- File transition lines smooth.

FOLIO REV: FA

DWG REV: f

1 Ø mm
14/10/02

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Quality Control

Memo

0.00

1 Ø mm
14/10/03

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Page 2

Stop *NR2*

120

120

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

1-Turn second side as per Folio FA166
2- File transition lines smooth.
3- Remove sand and plugs
4-Scribe part # and batch # using vibrating stylus
FOLIO REV: A
DWG REV: F

0.00

0.00

130

130

QC

Quality Control

QC1- Inspect dimensions to dimension sheet

0.00

Memo

+ PERFORM ULTRA SONIC MEASUREMENT

0.00

140

140

OC

Quality Control

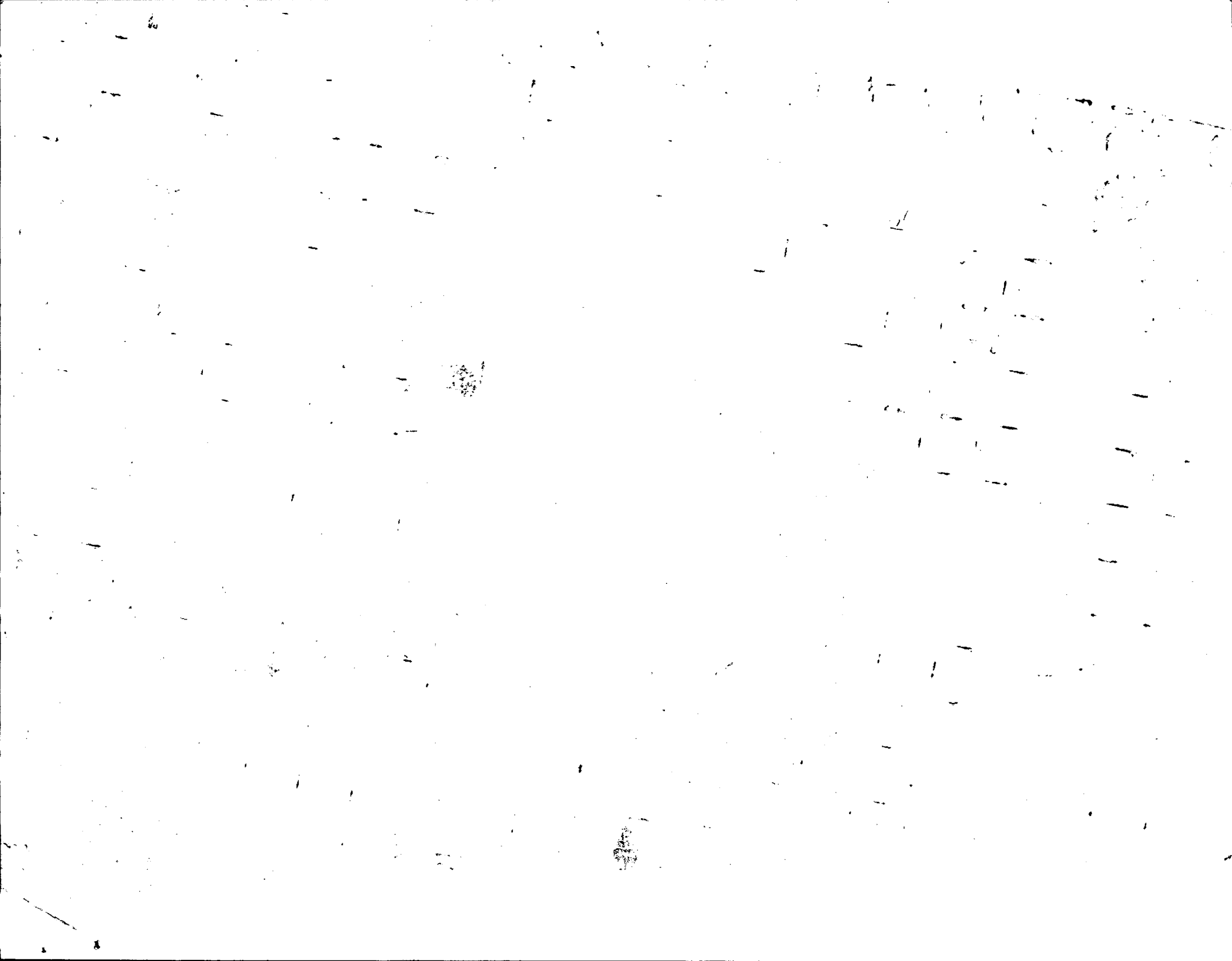
QC8- Inspect parts - second check

0.00

Memo

+ CHECK ULTRA SONIC MEASUREMENT AND ORIENTATION FOR BENDING

0.00



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Page 3

Wednesday, September 24, 2014 9:24:13 AM

Item ID: D412-664-203TRN Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Turning Detail
 Start Date: 9/24/2014 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 9/24/2014 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
145		0.00							
145									
Crosstubes	Memo	0.00							
Crosstubes	GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.								
150		0.00							
150									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	1- PRESSURE WASH X-TUBE INSIDE AND OUT								
	2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE								
160	QC5- Inspect part completeness to step on W/O	0.00							
160									
QC	Memo	0.00							
Quality Control									

BC 14-10-07

mm / BCL 14-10-07

(P) 14-10-07

DAS
38
9-89

Work Order ID 124833***124833***

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Wednesday, September 24, 2014 9:24:13 AM

Item ID: D412-664-203TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 9/24/2014 Start Qty: 1.00

1

Cust Item ID:

Required Date: 9/24/2014 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

170

0.00

170

Packaging

Packaging

Memo

0.00

Packaging

Identify and stock in kanban rack
Location: LBtw 14-10-07

180

0.00

180

QC

QC21- Final Inspection - Work Order Release

Memo

0.00

Quality Control

14/10/8 JS14-10-08

Picklist Print

Wednesday, September 24, 2014 9:24:16 AM

Page 1

Work Order ID: 124833

124833

Parent Item: D412-664-203TRN

D412-664-203TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 9/24/2014

Required Date: 9/24/2014

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A 08-03-06 new issue DD verified by:eec
IPP Rev B 08.04.02 Removed polish EC verified by: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6009-129		Manufactured	No			120	Each	40.5000	1	1			

D6009-129

Crosstube Material

Location

Loc Qty

Loc Code

LG003

40.5

107864

36.5

75627

3

75648

1

1 mm L 14/10/02

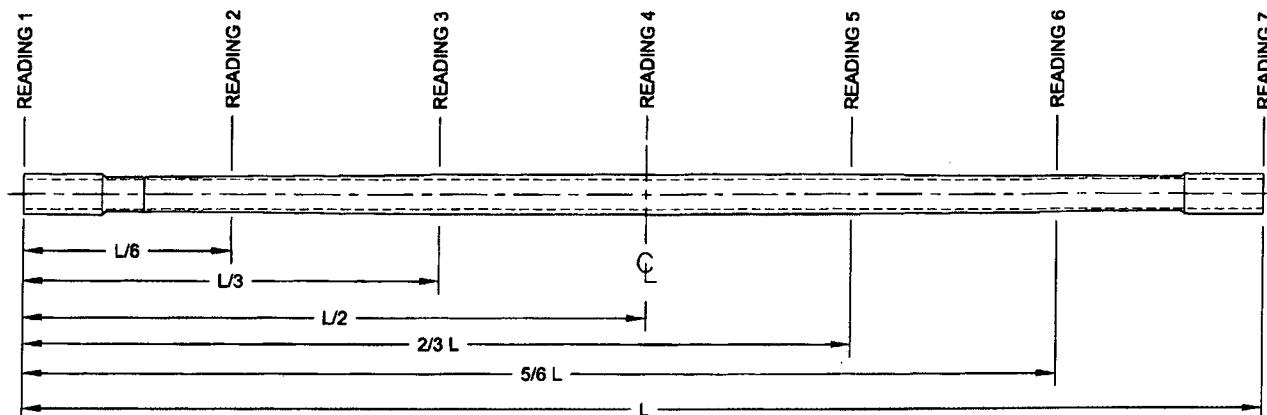
DART AEROSPACE LTD	Work Order:	124833
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: F		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.687	/		vern	CNC-08
	2.748	+0.005/-0.000	2.751	/			
	2.884	+0.005/-0.000	2.888	/			
	3.019	+0.005/-0.000	3.023	/			
	3.163	+0.005/-0.000	3.166	/			
	3.308	+0.005/-0.000	3.312	/			
	3.429	+0.005/-0.000	3.432	/			
	2.990	+0.005/-0.000	2.991	/			
	2.618	+0.005/-0.000	2.621	/			
	0.200	+/-0.010	.200	/		vern	CNC-08
	R0.063	+/-0.010	.063	/		RG	
	R0.500	+/-0.010	.500	/		"	
	4.971	+/-0.030	4.970	/		vern	CNC-08
SIDE B	2.684	+0.005/-0.000	2.688	/		vern	CNC-08
	2.748	+0.005/-0.000	2.752	/			
	2.884	+0.005/-0.000	2.888	/			
	3.019	+0.005/-0.000	3.023	/			
	3.163	+0.005/-0.000	3.166	/			
	3.308	+0.005/-0.000	3.312	/			
	3.429	+0.005/-0.000	3.432	/			
	2.990	+0.005/-0.000	2.990	/			
	2.618	+0.005/-0.000	2.621	/			
	0.200	+/-0.010	.200	/		vern	CNC-08
	R0.063	+/-0.010	.063	/		RG	
	R0.500	+/-0.010	.500	/		"	
	4.971	+/-0.030	4.970	/		vern	CNC-08
	124.100	+/-0.020	124.100	/		type	LG-11

DART AEROSPACE LTD	Work Order: 124833
Description: Crosstube Assembly (412 High Aft)	Part Number: D412-664-243
Inspection Dwg: D412-664-243 Rev: F	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.393	.381	.384	.394	.013	0.073"
READING 2 L= 20	.330	.341	.318	.360	.041	
READING 3 L= 42	.502	.526	.502	.470	.056	
READING 4 L= 62	.646	.641	.634	.636	.012	
READING 5 L= 82	.518	.506	.484	.491	.034	
READING 6 L= 104	.336	.322	.313	.324	.023	
READING 7 L= 124	.384	.376	.396	.465	.029	

Calibration Result

Actual Block Thickness: .100 - .750

Sitiescan 250 Measured Thickness: .100 - .750

Measured by: mmk
Date: 14/10/06

Audited by: JW
Date: 14.10.06

Preliminary Approval:
Date:

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	07.05.08	Tolerance updated for dimension 4.971	KJ/JLM	
D	10.02.02	Dimension 124.100 was 124.09	KJ	
E	12.06.04	Wall thickness form added	KJ	
F	14.06.24	Dwg Rev updated	KJ	

Item	Qty -243	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890 B-2	SEALANT

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING)
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT
- TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: DART P/N "D412-664-243" AND B/N ON INSIDE OF CUFF PER QSI 044 6.4 (VIBRATING STYLUS)
- WEIGHT: 47.0 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. DO NOT GRIND TUBE AFTER SHOT PEEN.

TURNING

- WHEN TRANSITIONING TO STOCK MAT'L, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.

BENDING

- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R30 BEND AND 8% (BASED ON O.D.) ON REMAINING TUBE.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

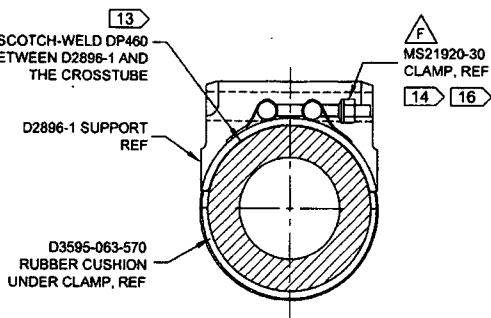
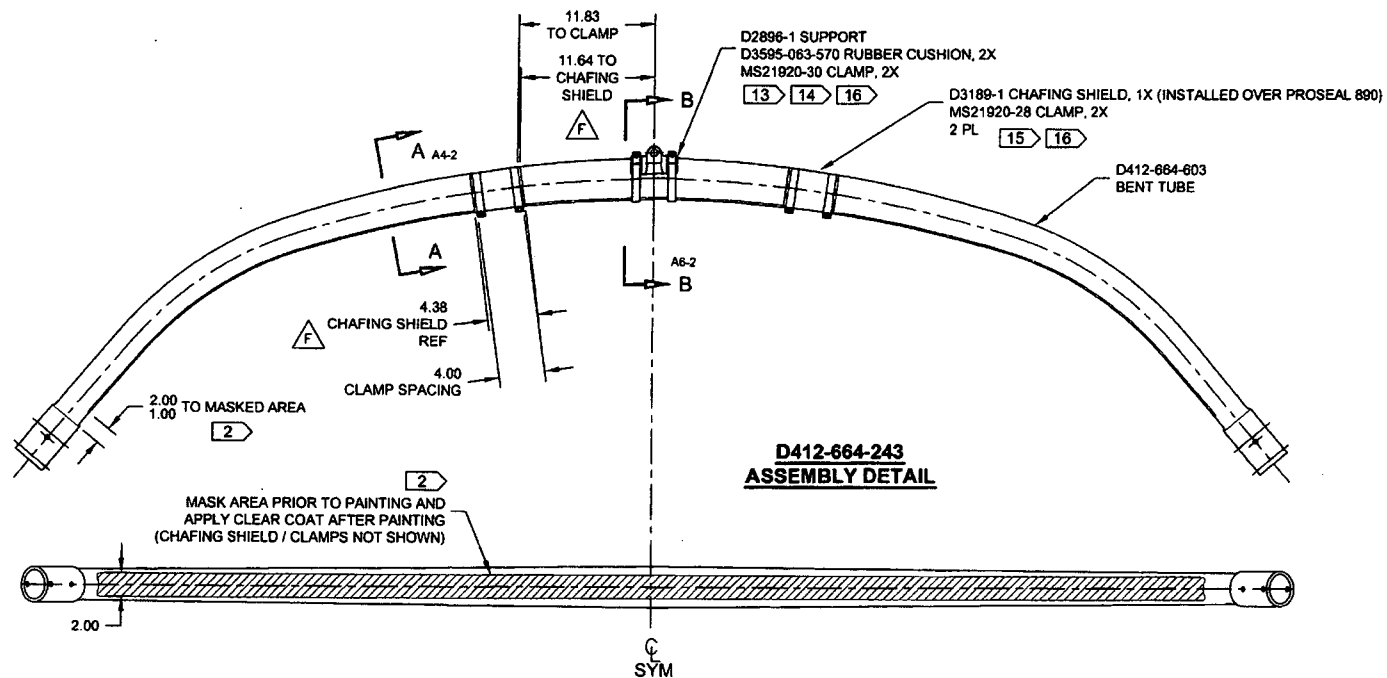
ASSEMBLY

- INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

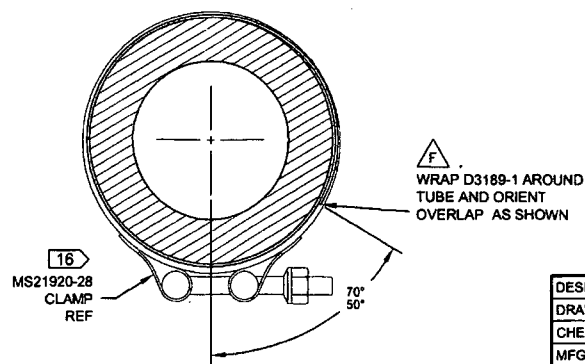
SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 124833 MLJ
1409-24

RELEASED
2014-05-26

F	NOTES RE-ORDERED, SCOTCH-WELD WAS MAGNOBOND (C8-1), ADD CLAMP RETORQUE (A8-1), REMOVE ABRASION STRIP, ADD INSPECTION WINDOW (C8-1), CHAFING SHIELD NOW 4.38 WIDE (C6-2), ADD 7% CRUSHING (B6-1), CHG BEND HEIGHT TOL. TO ±0.25 (C1-3), CHG CUFF TOL. (D2-4), CLAMPS FLIPPED TO PREVENT CHAFING (B7-2, B7-3), INCORP. DEO E-2/4	CP	14.04.01
E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #8 PER PAR 08-046 (ZN A8-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	08.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	q	DART AEROSPACE LTD HAWKESSBURY, ONTARIO, CANADA	
DRAWN	q		
CHECKED	DW	DRAWING NO.	REV. F
MFG. APPR.	243	D412-664-243	SHEET 1 OF 4
APPROVED	243	TITLE	SCALE
DE APPR.	243	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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SECTION B-B O4-2
SCALE 4X

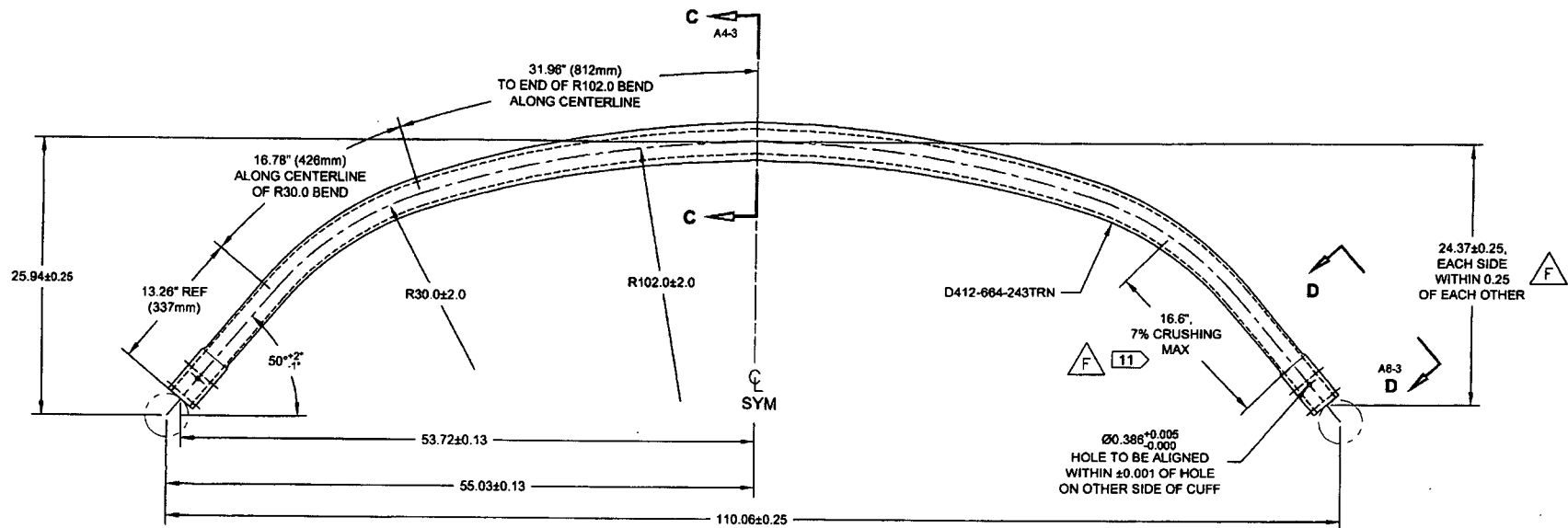


SECTION A-A D6-2
SCALE 6X

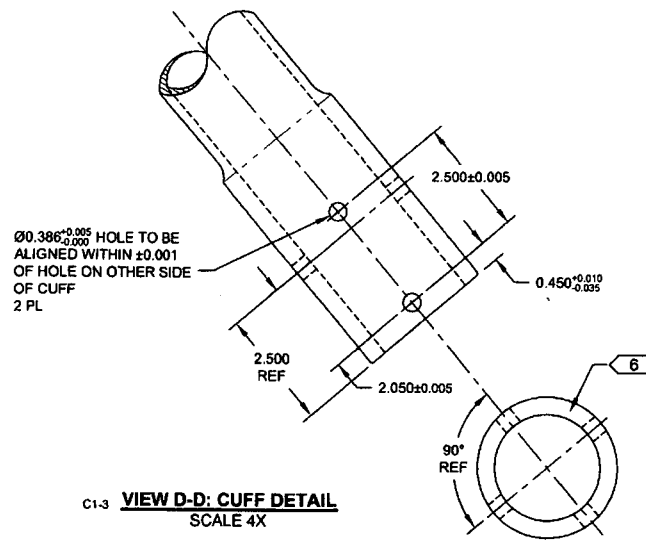
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2014-05-26

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DRAWN	92	HAWKESBURY, ONTARIO, CANADA	
CHECKED	92	DRAWING NO.	REV. F
MFG. APPR.	92	D412-664-243	SHEET 2 OF 4
APPROVED	92	TITLE	SCALE
DE APPR.	92	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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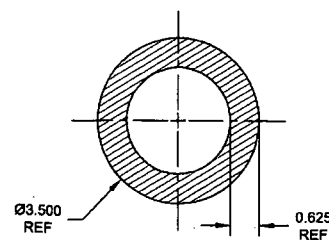
8 7 6 5 4 3 2 1



D412-664-603
BENDING AND DRILLING DETAIL



C1-3 **VIEW D-D: CUFF DETAIL**
SCALE 4X

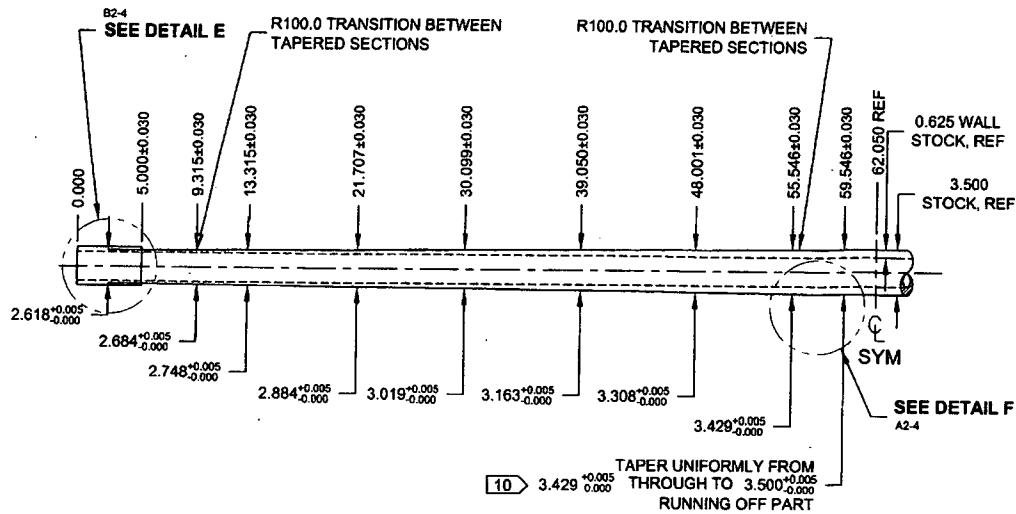


SECTION C-C D5-3
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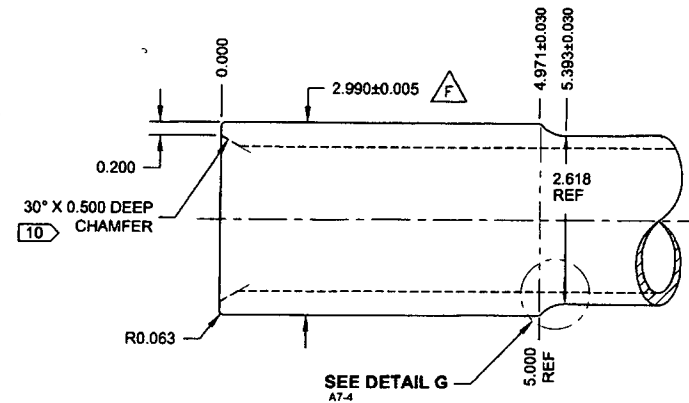
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DESIGN	<i>P</i>	DART AEROSPACE LTD	
DRAWN	<i>P</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>DW</i>	DRAWING NO. D412-664-243	REV. F
MFG. APPR.	<i>JS</i>		SHEET 3 OF 4
APPROVED	<i>JS</i>	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE NTS
DE APPR.	<i>JS</i>		
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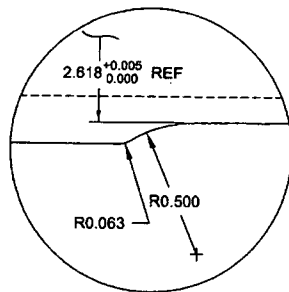
8 7 6 5 4 3 2 1



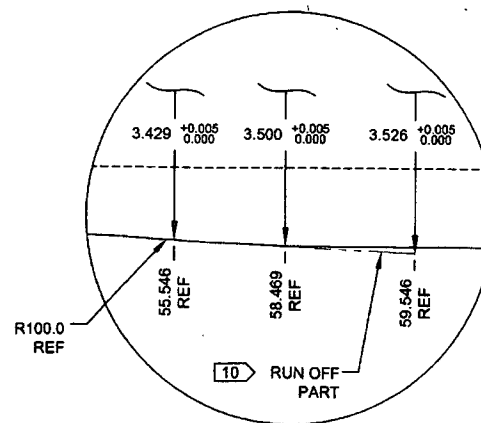
D412-664-243TRN
TURNING DETAIL



DETAIL E:
CROSSTUBE CUFF
SCALE SX



DETAIL G:
CUFF TRANSITION
SCALE 10X



DETAIL F:
TAPER RUN-OFF
NOT TO SCALE

RELEASED
2014-05-26

DESIGN	<i>g</i>	DART AEROSPACE LTD	
DRAWN	<i>g</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>g</i>	DRAWING NO.	REV. F
MFG. APPR.	<i>g</i>	D412-664-243	SHEET 4 OF 4
APPROVED	<i>g</i>	TITLE	SCALE
DE APPR.	<i>g</i>	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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